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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/941,142	08/28/2001	Jeffrey Meng Wah Chan	004-2628-1	7123
22120	7590	11/19/2004	EXAMINER	
ZAGORIN O'BRIEN & GRAHAM, L.L.P. 7600B N. CAPITAL OF TEXAS HWY. SUITE 350 AUSTIN, TX 78731			HARKNESS, CHARLES A	
			ART UNIT	PAPER NUMBER
			2183	

DATE MAILED: 11/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/941,142

Applicant(s)

WAH CHAN ET AL.

Examiner

Charles A Harkness

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-55 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 21-55 are rejected under 35 U.S.C. 102(b) as being anticipated by Barlow U.S. Patent Number 5,168,564 (herein referred to as Barlow).

3. Referring to claims 21, 32, and 45 Barlow has taught a method comprising; speculatively locking a resource to be accessed by execution of a first instruction, wherein the locking is performed prior to determining whether a hazard exists between the access and execution of a second instruction (Barlow column 1 lines 50-61, column 2 lines 40-64; the lock indicator, or mechanism can be canceled after it is set once it is determined that the command using the resource that is locked is invalid, therefore the resource is being locked before the command has been determined to have hazards, and before the command is known to go until completion, which goes along with the definition of prior to a determination of a hazard in the instant application at page 2 line 23-page 3 line 4).

4. Referring to claims 22, 34, and 46 Barlow has taught wherein the locking is performed prior to the first instruction entering a trap stage of an instruction pipeline (Barlow column 7 line 60-column 8 line 3, figure 4a, column 5 lines 9-18; the fault, which is the same thing as a trap, or exception, causes the cancel command, but this is after the lock has already occurred, and must be cancelled).

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5. Referring to claims 23, 35 and 47 Barlow has taught wherein the first instruction is an atomic instruction including a portion to lock the resource and a portion to unlock the resource (Barlow column 1 lines 50-61; the resource is locked at the read portion and reset after the write portion of the operation).
6. Referring to claims 24, 36, and 48 Barlow has taught wherein the hazard includes a read-after-write hazard (Barlow column 1 lines 43-61; the resource is locked at the read portion and reset at the write portion of the operation).
7. Referring to claims 25, 37, and 49 Barlow has taught wherein the locking includes: locking the resource during an effective address calculation stage of an instruction pipeline (Barlow column 4 lines 35-51, column 5 lines 9-19).
8. Referring to claims 26, 38, and 50 Barlow has taught wherein the locking includes locking at least a portion of a cache (Barlow column 5 lines 26-40, column 9 line 53-column 10 line 16).
9. Referring to claims 27, 39, and 51 Barlow has taught wherein the locking includes locking at least one memory address (Barlow column 5 lines 26-40, column 9 line 53-column 10 line 16; every entry in the cache is a memory address).
10. Referring to claims 28, 40, and 52 Barlow has taught further comprising unlocking the resource no later than a time at which the first instruction exits an instruction pipeline, regardless of whether the first instruction is cancelled (Barlow column 1 lines 50-61; the resource is locked at the read portion and reset after the write portion of the operation – after the write portion of the operation, the process is complete and therefore leave the pipeline).

11. Referring to claims 29 and 53 Barlow has taught wherein unlocking the resource includes:

unlocking the resource in the normal course of executing the computer instruction (Barlow column 1 lines 50-61; the resource is locked at the read portion and reset after the write portion of the operation – after the write portion of the operation, the process is complete and therefore leave the pipeline).

12. Referring to claims 30, 41, and 54 Barlow has taught wherein unlocking the resource includes preventing a write portion of the first instruction from altering information held in at least a portion of the resource (Barlow column 2 lines 40-64 – the other resources are not affected).

13. Referring to claims 31 and 55 Barlow has taught wherein preventing a write portion from altering information includes suppressing writing a value to an architectural storage location (Barlow column 2 lines 40-64; since the operation is being canceled, there will be no write-back to the registers).

14. Referring to claim 33 Barlow has taught further comprising a plurality of processing cores, wherein respective processing cores are adapted to lock the resource in response to respective accesses by respective first instructions prior to determining whether a hazard exists between the respective accesses and the second instruction (Barlow column 9 lines 3-26; multiple cores have access to the same resource).

15. Referring to claim 42 Barlow has taught a processor adapted to speculatively dispatch a load operation to a cache unit prior to determining whether read-after-write hazards associated with the load operation are present (Barlow column 1 lines 50-61, column 2 lines 40-64; the lock

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indicator, or mechanism can be canceled after it is set once it is determined that the command using the resource that is locked is invalid, therefore the resource is being locked before the command has been determined to have hazards, and before the command is known to go until completion, which goes along with the definition of prior to a determination of a hazard in the instant application at page 2 line 23-page 3 line 4 – the first portion of a read modify write is a read from memory, which is the same as a load type instruction).

16. Referring to claim 43 Barlow has taught the processor of claim 42 wherein the processor is adapted to lock a resource associated with the load operation concurrently with dispatching the load operation (Barlow column 1 lines 50-61, column 2 lines 40-64; the lock indicator, or mechanism can be canceled after it is set once it is determined that the command using the resource that is locked is invalid, therefore the resource is being locked before the command has been determined to have hazards, and before the command is known to go until completion, which goes along with the definition of prior to a determination of a hazard in the instant application at page 2 line 23-page 3 line 4 – the first portion of a read modify write is a read from memory, which is the same as a load type instruction – the resource is locked during the read portion).

17. Referring to claim 44 Barlow has taught the processor of claim 43 wherein the processor is further adapted to unlock the resource associated with the load operation no later than a time at which an instruction implementing the load operation exits an instruction pipeline, regardless of whether the instruction is cancelled before exiting the instruction pipeline (Barlow column 1 lines 50-61; the resource is locked at the read portion and reset after the write portion of the

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operation – after the write portion of the operation, the process is complete and therefore leave the pipeline).

### ***Response to Arguments***

18. Applicant's arguments filed 08/19/04 have been fully considered but they are not persuasive.

19. In the remarks, in regard to the rejections of the claims, Applicant argues in essence that:

“...Barlow discloses no relationship between determination of a hazard and determination that an instruction is invalid, and thus Barlow does not teach or suggest locking a resource prior to completing a determination of hazards.”

20. This is not found persuasive. As shown in Barlow (column 1 lines 50-61), the resource is locked during the read operation, therefore before the write portion tries to access the same memory location. Since the hazard has not yet been processed, and the memory location is already locked, the lock occurs before the determination of any hazard. There is also shown in Barlow (column 1 line 62-column 2 line 17, column 2 lines 40-64) for reasons to be able to disengage the locking device if it isn't needed, or is on by accident. The lock indicator, or mechanism can be canceled after it is set once it is determined that the command using the resource that is locked is invalid, therefore the resource is being locked before the command has been determined to have hazards, and before the command is known to go until completion, which goes along with the definition of prior to a determination of a hazard in the instant application at page 2 line 23-page 3 line 4.

### ***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles A Harkness whose telephone number is 571-272-4167.

The examiner can normally be reached on 8Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on 571-272-4162. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charles Allen Harkness

Patent Examiner

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November 11, 2004

  
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